SPEC® CFP2006 Result

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IBM Corporation

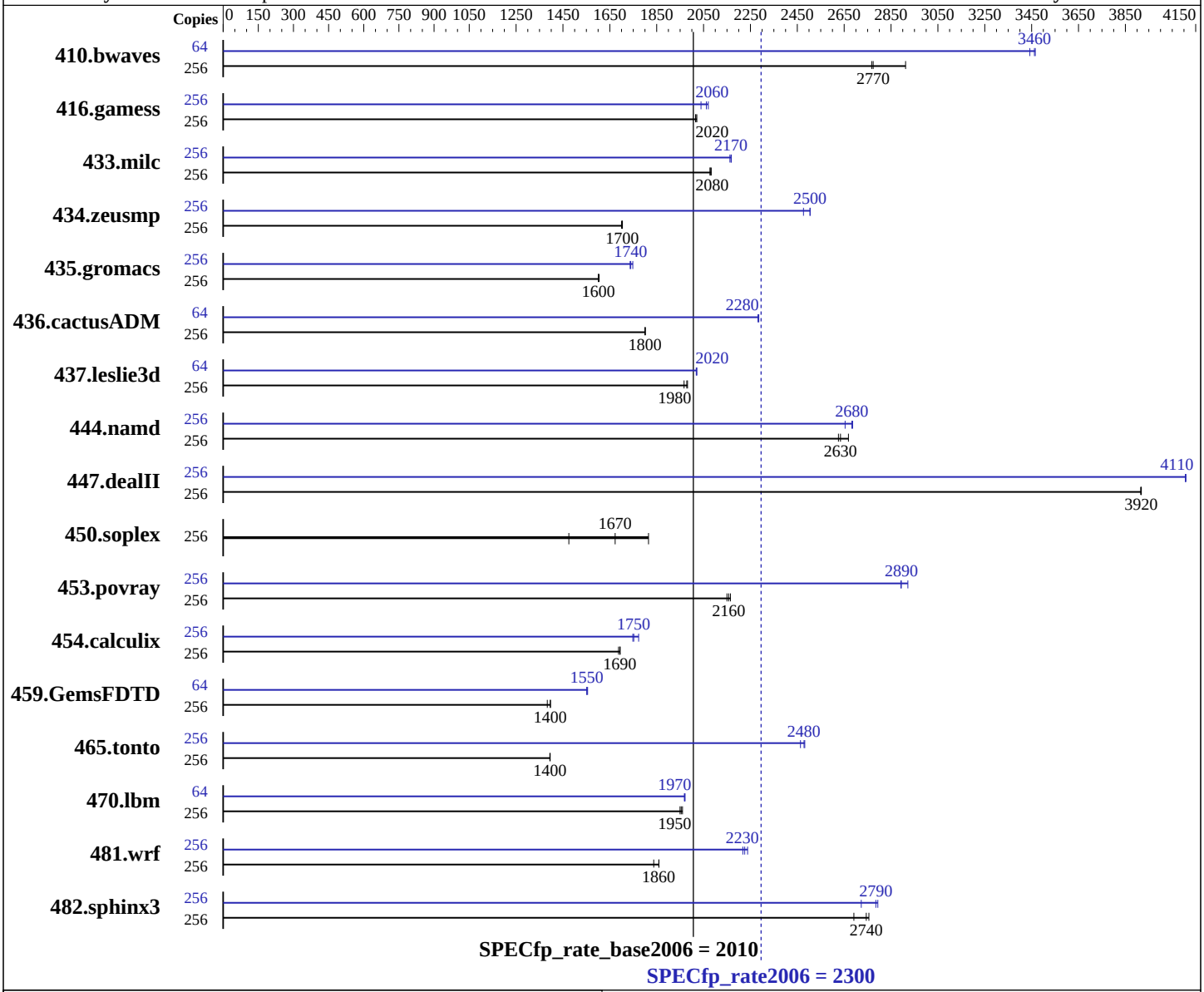
IBM Power 780 (3.86 GHz, 64 core, SLES)

SPECfp®_rate2006 = 2300

SPECfp_rate_base2006 = 2010

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Dec-2009



Hardware

CPU Name:	POWER7
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.94 GHz
CPU MHz:	3860
FPU:	Integrated
CPU(s) enabled:	64 cores, 8 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	8,16,24,32,48,64 cores
Primary Cache:	32 KB I + 32 KB D on chip per core

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Software

Operating System:	SUSE Linux Enterprise Server 11 (ppc64), Kernel 2.6.27.19-5-ppc64
Compiler:	IBM XL C/C++ for Linux, V10.1 Updated with the Oct2009 PTF IBM XL Fortran for Linux, V12.1 Updated with the Oct2009 PTF
Auto Parallel:	No
File System:	ext3

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Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	4 MB I+D on chip per core
Other Cache:	None
Memory:	512 GB (64x8 GB) DDR3 1066 MHz
Disk Subsystem:	6x146.8 GB SAS SFF 15K RPM
Other Hardware:	None

System State:	Run level 3 (multi-user)
Base Pointers:	32-bit
Peak Pointers:	32/64-bit
Other Software:	-Post-Link Optimization for Linux on POWER, Version 5.5.0-1 -MicroQuill SmartHeap 9

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	256	1257	2770	**1254**	**2770**	1195	2910	64	251	3470	253	3440	**251**	**3460**
416.gamess	256	**2485**	**2020**	2480	2020	2487	2020	256	2458	2040	**2431**	**2060**	2421	2070
433.milc	256	1131	2080	1128	2080	**1131**	**2080**	256	1087	2160	**1084**	**2170**	1084	2170
434.zeusmp	256	1370	1700	**1368**	**1700**	1367	1700	256	**930**	**2500**	941	2480	930	2500
435.gromacs	256	1142	1600	**1141**	**1600**	1139	1600	256	1046	1750	**1051**	**1740**	1053	1740
436.cactusADM	256	**1699**	**1800**	1700	1800	1698	1800	64	335	2280	**335**	**2280**	335	2290
437.leslie3d	256	1214	1980	1223	1970	**1216**	**1980**	64	298	2020	298	2020	**298**	**2020**
444.namd	256	782	2630	**779**	**2630**	769	2670	256	774	2650	764	2690	**765**	**2680**
447.dealII	256	747	3920	**748**	**3920**	748	3920	256	**713**	**4110**	713	4110	713	4110
450.soplex	256	**1276**	**1670**	1447	1480	1176	1820	256	**1276**	**1670**	1447	1480	1176	1820
453.povray	256	634	2150	629	2160	**631**	**2160**	256	471	2890	**471**	**2890**	466	2920
454.calculix	256	1247	1690	1252	1690	**1248**	**1690**	256	**1205**	**1750**	1208	1750	1191	1770
459.GemsFDTD	256	**1946**	**1400**	1944	1400	1964	1380	64	438	1550	**437**	**1550**	437	1560
465.tonto	256	**1806**	**1400**	1807	1390	1805	1400	256	1015	2480	**1016**	**2480**	1023	2460
470.lbm	256	1804	1950	**1800**	**1950**	1794	1960	64	447	1970	**446**	**1970**	446	1970
481.wrf	256	1556	1840	**1538**	**1860**	1538	1860	256	1289	2220	1278	2240	**1285**	**2230**
482.sphinx3	256	1854	2690	1811	2760	**1818**	**2740**	256	1832	2720	1786	2790	**1791**	**2790**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

```
The config file option 'submit' was used.
Benchmarks bound to a processor using numactl on the submit command.
```

Operating System Notes

```
ulimit -s (stack) set to 1048576.
Large pages reserved as follows by root user:
    echo 16896 > /proc/sys/vm/nr_hugepages
System configured with libhugetlbfs library for application access to large pages
Environment variables set before executing benchmarks.
    export HUGETLB_VERBOSE=0
    export HUGETLB_MORECORE=yes
    export XLFRTEOPTS=intrinthds=1
```

General Notes

```
IBM Post-Link optimization tool with
    options "-O4 -omullX -see 0 -m power6" used for
       433.milc 435.gromacs 436.cactusADM 482.sphinx3
    options "-O4 -omullX -see 1" used for
       436.cactusADM
    options "-O4 -omullX -see 1 -ihf -1" used for
       453.povray
    options "-O4" used for
       465.tonto
     Whenever option "-omullX" was used during the optimization phase,
       option "-imullX" was also used during the instrumentation phase.
```

Base Compiler Invocation

C benchmarks:
```
xlc -qlanglvl=extc99
```

C++ benchmarks:
```
xlC
```

Fortran benchmarks:
```
xlf95
```

Benchmarks using both Fortran and C:
```
xlc -qlanglvl=extc99 xlf95
```

Base Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
434.zeusmp: -qfixed
435.gromacs: -qfixed -qextname
436.cactusADM: -qfixed -qextname
437.leslie3d: -qfixed
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Base Optimization Flags

C benchmarks:
```
-O5 -qnoenablevmx -lhugetlbfs
```

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Base Optimization Flags (Continued)

C++ benchmarks:
```
-O5 -qrtti -qnoenablevmx -qstaticlink
-Wl,--whole-archive /usr/lib/libhugetlbfs.a -Wl,--no-whole-archive
```

Fortran benchmarks:
```
-O5 -qsmallstack=dynlenonheap -qalias=nostd -qnoenablevmx
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT
```

Benchmarks using both Fortran and C:
```
-O5 -qnoenablevmx -qsmallstack=dynlenonheap -qalias=nostd
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT
```

Base Other Flags

C benchmarks:
```
-qipa=noobject -qipa=threads
```

C++ benchmarks:
```
-qipa=noobject -qipa=threads
```

Fortran benchmarks:
```
-qipa=noobject -qipa=threads
```

Benchmarks using both Fortran and C:
```
-qipa=noobject -qipa=threads
```

Peak Compiler Invocation

C benchmarks:
```
xlc -qlanglvl=extc99
```

C++ benchmarks:
```
xlC
```

Fortran benchmarks:
```
xlf95
```

Benchmarks using both Fortran and C:
```
xlc -qlanglvl=extc99 xlf95
```

Peak Portability Flags

410.bwaves: `-qfixed`

Continued on next page

Peak Portability Flags (Continued)

416.gamess: -qfixed
434.zeusmp: -qfixed
435.gromacs: -qfixed -qextname
436.cactusADM: -qfixed -qextname
437.leslie3d: -qfixed
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: -Wl,-q -O5 -qnoenablevmx -lhugetlbfs

470.lbm: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT
-q64

482.sphinx3: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -lhugetlbfs

C++ benchmarks:

444.namd: -qpdf1(pass 1) -qpdf2(pass 2) -O5

447.dealII: -O5 -qrtti -qnoenablevmx -qstaticlink -Wl,-z,muldefs
-Wl,--whole-archive /usr/lib/libsmartheap.a
-Wl,--no-whole-archive

450.soplex: basepeak = yes

453.povray: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -lsmartheap

Fortran benchmarks:

410.bwaves: -O5 -qsmallstack=dynlenonheap -lhugetlbfs

416.gamess: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qalias=nostd
-qnoenablevmx

434.zeusmp: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto
-qxlf90=nosignedzero -B/usr/share/libhugetlbfs/ -tl
-Wl,--hugetlbfs-link=BDT

437.leslie3d: -O5 -qsmallstack=dynlenonheap -qnoenablevmx
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT

Continued on next page

Peak Optimization Flags (Continued)

459.GemsFDTD: `-O5 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT -q64`

465.tonto: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -q64 -lsmartheap64`

Benchmarks using both Fortran and C:

435.gromacs: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -lhugetlbfs`

436.cactusADM: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O2 -qarch=auto -qtune=auto -qnostrict -lhugetlbfs`

454.calculix: `-O4 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT`

481.wrf: `-O5 -qnoenablevmx -q64 -lhugetlbfs`

Peak Other Flags

C benchmarks:
`-qipa=noobject -qipa=threads`

C++ benchmarks:
`-qipa=noobject -qipa=threads`

Fortran benchmarks:
`-qipa=noobject -qipa=threads`

Benchmarks using both Fortran and C:
`-qipa=noobject -qipa=threads`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100302.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100302.xml`

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